



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/724,426

11/26/2003

Johnny Zhong

15436.135.1

1047

7590

10/18/2004

R. BURNS ISRAELSEN  
WORKMAN NYDEGGER  
1000 Eagle Gate Towe  
60 East South Temple  
Salt Lake City, UT 84111

EXAMINER

KIM, JOANNE H


ART UNIT

PAPER NUMBER

2883

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/724,426	<b>Applicant(s)</b> ZHONG ET AL.	
	<b>Examiner</b> Joanne H. Kim	<b>Art Unit</b> 2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 August 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 and 25-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>07/28/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of claims 6-24 in the reply filed on August 31, 2004, is acknowledged.

Regarding Applicant's remarks in the reply, claim 25 recites an optical add/drop module including "the fused fiber interleaver in the final stage being less sensitive to temperature changes." Even though claim 25 does not specifically recite a "ceramic sleeve disposed about the fused fiber interleaver," as disclosed the fused fiber interleaver is less sensitive to temperature because of a ceramic sleeve disposed about the fused fiber interleaver.

Further, as disclosed and claimed, species II (claims 1-24) and species III (claims 25-27) provide different solutions for different problems of species I (claims 1-5). That is, the species I, which includes fused fiber interleavers in a final stage of an add portion, has a Gaussian frequency response and is sensitive to temperature change. The species II provides a solution for a problem related to the Gaussian response by providing a thin film interleaver in the final stage of the add portion and the species III provides a solution for temperature sensitivity by providing a ceramic sleeve.

Accordingly, Examiner holds to the propriety of the basis for the election of species requirement and maintains it in its current form.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "422" in paragraph [0040], line 6; "426" in paragraph [0041], line 4; and "604" in paragraph [0044], line 5. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification does not disclose that the flat-top frequency response is essentially constant over a bandwidth about a defined carrier channel wavelength, wherein the bandwidth is about  $\pm 6\text{nm}$  as recited in claims 12 and 22.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 12 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear how the flat-top frequency response can be essentially constant over a bandwidth of  $\pm 6\text{nm}$ . Accordingly, the claims 12 and 22 have not been further treated on the merits.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 6-11, 13-21 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luo et al. (U.S. Patent No. 6,256,433, hereinafter "Luo") in view of Wu et al. (U.S. Patent No. 6,512,615, hereinafter "Wu").
8. Regarding claims 6, 11, 13, 15-16, 21, and 23, Luo discloses an optical add/drop module comprising: a drop portion including a plurality of thin film filters (thin film three-port devices), wherein each thin film filter drops a particular channel from a WDM signal; and an add portion that adds channels of the WDM signal dropped by the drop portion

back to the WDM signal, wherein the add portion comprises a plurality of interleavers disposed in stages in a cascade arrangement (column 2, lines 1-12 and 35-47).

Luo does not specifically disclose that the add portion comprises a first stage of interleavers, wherein each interleaver in the first stage is a fused-fiber interleaver, and a final stage including a thin film interleaver with a flat-top frequency response, wherein the final stage exhibits isolation of channels and the flat-top frequency response is essentially constant over a bandwidth.

Wu discloses an optical add/drop module (i.e., multiplexer/demultiplexer) including a plurality of interleavers in a cascade arrangement. Wu discloses that an add portion (i.e., multiplexer) of the add/drop module includes a flat-top slicer such as a polarization-based filter and its equivalents in a final stage where the channels are most densely packed and that the preceding devices in the cascade arrangement can be based on a number of technologies including a fused biconical taper technology or interference filters (column 2, lines 42-46; column 3, line 1-10; column 4, lines 5-9 and 51-67; and column 6, lines 15-17). Wu discloses that the flat-top slicer provides a channel separating function, which has adequate flatness and isolation (column 5, lines 49-52). Wu also discloses that the flat-top frequency response is essentially constant over a bandwidth about a defined carrier channel wavelength (Fig. 6 and column 5, lines 49-52).

Further, it is well known that an interleaver based on the fused biconical taper technology includes a fused-fiber interleaver and the equivalent of the polarization-based filter includes a thin film interleaver such as a multi-cavity Fabry-Perot etalon.

Accordingly, it would have been obvious to modify Luo to include the flat-top slicer (i.e., a thin film interleaver with a flat-top frequency response) in a final stage of an add portion and a fused-fiber interleaver in a first stage of the add portion such as that taught by Wu in order to provide a low cost add/drop module with good peak flatness, high isolation and low crosstalk.

9. Regarding claims 7-8, 17-18 and 24, Lou discloses that at least one of the thin film filters of the drop portion is configured to allow a particular channel to pass through the thin film filter while reflecting other channels (column2, lines 1-12). Lou also discloses that each thin film filter of the drop portion is configured to reflect a particular channel from the WDM signal while allowing other channels to pass through the thin film filter (column 2, lines 37-41).

10. Regarding claims 9-10 and 19-20, Wu discloses that the thin film filters of the drop portion is configured to deinterleave a multiplexed signal by allowing a first group of channels to pass through the thin film filter while reflecting a second group of channels, wherein each group of channels comprises alternating channels (column 3, line 1-10; and column 5, lines 8-18).

11. Regarding claims 14 and 24, as discussed above in paragraph 8, the equivalent of the polarization-based filter includes a thin film interleaver such as a multi-cavity Fabry-Perot etalon, which includes a plurality of cavities comprising one or more thin film layers and a spacer and a final cavity comprising a spacer that includes a matching layer designed with an index of refraction intended to match the thin film interleaver to surrounding air or to another device.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Salerno et al. (U.S. Patent Pub. No. 2003/01223827) discloses an optical device including multi-cavity Fabry-Perot resonators, which can be tuned to operate on selected wavelengths over a wide spectral range by inducing a small change in the refractive index, to create flat-top optical filters to provide the pass-band and drop-off characteristics essential for low-cross talk wavelength selection in WDM applications;

Tai (U.S. Patent No. 6,275,322) discloses an optical interleaver/deinterleaver providing a periodic flat-top frequency response and isolation of optical channels by combining a Fabry-Perot phase shifter (FPPS) and a Michelson interferometer;

Cormack (U.S. Patent Pub. No. 2003/0053747) discloses an optical add/drop filter comprising a cascade of thin film filters, each of which reflects a particular channel from WDM signal while allowing other channels to pass through; and

Barry et al. (U.S. Patent Pub. No. 2002/0118417) discloses an optical add/drop module including a plurality of thin-film filters in a cascade arrangement.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joanne H. Kim whose telephone number is (571) 272-2139. The examiner can normally be reached on 8:30 a.m. to 5:00 p.m.



Art Unit: 2883

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Joanne H. Kim  
Examiner  
Art Unit 2883

jk/FGF



Frank G. Font  
Supervisory Patent Examiner  
Technology Center 2800